THE BLOOD PRESSURE AMONG HIGH RISK PILGRIMS OF KLOTER 30 BEKASI, YEAR 2003 BEFORE DEPARTURE IN INDONESIA AND AFTER *UMRAH* IN MECCA

Betty Roosihermiatie[1], Sarwanto[1], Siswanto[1]

ABSTRACT

The main cause of mortality among Indonesian pilgrims was circulatory diseases. The death was common among old pilgrims, especially due to heart failure. It is known that hypertension is one of the causes of heart failure. The study aimed to determine blood pressures among high risk pilgrims after umrah in Mecca, Saudi Arabia and blood pressure in Indonesia with influencing factors: sex, body mass index, accommodation room density, and number of condition/diseases. It was an observational study. Twenty eight high risk pilgrims of kelompok terbang (kloter) or flight group 30 JKS year 2003 were voluntarily participated in the study. The blood pressure of the respondents was measured at sitting position. Mean differences of systolic and diastolic blood pressure in Indonesia and after umrah was compared by paired t-test. Systolic blood pressure in Indonesia after umrah, by controlling confounding variables, was analyzed by linear regression model. The systolic blood pressure of respondents after umrah tended to decrease to 0.43 mm Hg in comparison to 1 mmHg increase on examination in Indonesia, at number of conditions/diseases to be constant. It is likely that the psychological sincerity (ikhlas) has influenced the decrease of sympathetic innervations system in brainstem for blood pressure to lower of systolic blood pressure. Meanwhile, the systolic blood pressure after umrah tended to increase to 11.94 mmHg for a number of conditions/diseases to be constant. The pilgrimage activities is hard, especially in surrounding higher climate at the average of 39° C. So pilgrims with the condition as old people or having diseases influenced the systolic blood pressure. The peripheral vasoconstriction possibly caused increase systolic blood pressure. Pilgrimage is a hard physical activity, moreover for high risk pilgrims. Hence, monitoring pilgrim health conditions, especially the high risk pilgrims, should be conducted by kloter health workers, like to control blood pressure as one of health indicators. Because hypertension is one of heart failure causes.

Key words: *systolic blood pressure, high risk pilgrims, old persons, diseases*

INTRODUCTION

The majority of Indonesian people are Moslem. Since year 2000 with a total population of about 200 million people, the Indonesia government has about 1% of the population quota hajj from Saudi Arabia government each year. Hajj is visiting Ka'bah in Mecca as the fifth or last of Islam principles (Ministry of Religion, 2006[a]). Conducting hajj is compulsory if someone is able to do so. "Able" is meant not only capable to do religion affairs, but also physical, psychological, and economic ability. One of the pilgrimage phenomenon is relatively higher old pilgrims due to the ability factors. Although recently, many younger people do hajj (Ministry of Religion, 2006[b]).

Some of the government policies on hajj are the Minister of Health Decree No. 1394 year 2002 on *Guidelines to Organize Indonesian Hajj*, Law No. 17 year 1999 on *Organizing Hajj* (the state issue year 1999 No. 53, additional issue No. 3839). There is also Minister's Decree on *Pregnant Women Conducting Hajj*. Furthermore, the Instruction of Director General of Communicable Disease Control and Environmental Health No. HK.00.06.5.233 on *Guidelines of Examination and Health Education for Pilgrimage Candidates* aims to assure pilgrims health in conducting their religious duties. The education on pilgrim health aims at enhancing the ability to determine and manage their health, enhancing knowledge and

[1] Pusat Penelitian dan Pengembangan Sistem dan Kebijakan Kesehatan, Badan Litbangkes Depkes RI, Jl. Indrapura No. 17, Surabaya 60176

Korespondensi: E-mail: roosihermiatie@yahoo.com

practice on healthy food and also physical exercises to maintain health conditions. For the reasons, hajj medical services is started in Indonesia, there are in health centers, district/municipality hospitals, embarcation/debarcation ports and will continue in airplanes, and in Saudi Arabia. Basically the health examination for pilgrimage candidates are conducted in two stages. First, the examination is conducted in health centers; and the second is in district or municipality levels. The overall objectives of the examination are 1) to identify health conditions and risk factors of the pilgrimage candidates, 2) to complete right data on health conditions and risk factors in the health pilgrimage book, 3) to function the health pilgrim book in facilitating further treatments and cares during transport, and in hajj embarkations, Saudi Arabia and 14 days after returning from Saudi Arabia, 4) to complete health requirements of pilgrimage candidates who will depart to Saudi Arabia (Ministry of Religion, 1995).

Furthermore, pilgrimage candidates should have meningitis vaccination as meningitis is endemic in Middle East. The objective of meningitis meningococcus tetravalent vaccination is to provide specific Meningitis Meningococcus (MM) immunity. Schedules for the Meningitis meningococcus tetravalent vaccination are 1) at least 10 days before departing to Saudi Arabia, 2) but if the vaccination is given less than 10 days before departing, the candidates should have ciprofloxacin 500 mg single dose as a prophylaxis. It is meant to anticipate the threats of MM outbreak in hajj community as early vigilance to the disease.

Surveillance epidemiology is also conducted. The objective of surveillance epidemiology on pilgrim health is to prevent export and import of communicable diseases that could be brought by pilgrims/candidates, to determine disease distributions, mortalities according to time, place, and risk factors of pilgrims/candidates. Data collection, analysis, dissemination are done since pilgrims/candidates to be examined for their health in their districts/municipalities, during transport, in Saudi Arabia and after returning from Saudi Arabia up to 14 days in their residences.

Pilgrimage is physical activities. Pilgrims usually walk from their accommodation to mosques with an overall of about 350 km during 38 days in Saudi Arabia or about 10 km a day for 5 times praying, excluding *thawaf* and sa'i for *umrah*/hajj. A *thawaf* is encircling Ka'bah 7 times and a sa'i is walking from Shofa hill to Marwah hill 7 times, with total distance is about 3.6 km (Ministry of Religion, 2006[a]). Moreover, pilgrims should walk upstairs if the first floor of Haram mosque in Mecca is full, or when they are back to their accommodation room if not using elevator. Furthermore, the climate in Saudi Arabia differs with in Indonesia. Here in Indonesia, almost all areas have tropical climate and windy with average temperatures of 25–32° C and 60–80% humidity. Meanwhile, in Saudi Arabia up to year 2014 it has winter. Cities to be visited by the pilgrims, i.e. Jeddah, Madina and Mecca have varied temperatures. The average temperature range 15–23° C in Jeddah, 25–30° C in Mecca, 29–32° C in Madina, and with only 15–20% of humidity. It sometimes rains there (Kusuma, 1989; Ministry of Religion, 2006[a]). For the reasons, pilgrimage candidates should do physical exercises (Sukarna, 1986; Kusuma, 1989). The physical exercise book for pilgrims is one of the efforts to enhance the pilgrimage candidates to be healthy. The book is to be used as a guidance for pilgrimage district health managers and others to provide physical exercise training for pilgrimage candidates, especially aged persons.

Moreover, pilgrims who could not bear cold weather, are asked to wear double or triple of their cloths. So besides uniform, pilgrims should bring thick cloths, such as jackets and *sweaters*. Pilgrims should not be ashamed to use lip moisture to prevent cracked or dry lips and also skin and face moisture cream to prevent skin dryness, especially heel, nose and face. Besides, cold exposures cause mild to severe disturbance to the body (Ministry of Religion, 2006[a]).

Data on Indonesia pilgrims year 2000–2003 on about 200 thousands pilgrims showed the majority of the pilgrims (about 50%) came from 5 provinces in Java with 3 higher, East Java (18–23%), West Java (12–17%) and Central Java (9–11%). According to age, the majority the pilgrims (about 30%) were aged 41–50 years old. The pilgrims aged 50 years old or above has increased from about 30% in 2000–2001 to 60% in 2002–2003. For education, about 40% pilgrims were elementary school, and for hajj experience, only about 10% had conducted hajj (Ministry of Religion, 2006[b]).

The pilgrim mortality data year 2003 showed 466 deaths of pilgrims, similar to year 2004 and 2005. It was about 3 deaths per 1000 pilgrims or could be said as an outbreak. Mostly, 88.9% pilgrim deaths occurred among high risk groups. According the cause of pilgrim

deaths, the majority (60.02%) were of circulation and 30.09% of respiratory diseases. Meanwhile for pilgrim morbidities, the majority were upper respiratory diseases, digestive diseases, muscle and bone diseases, respiratory diseases, and cold exposure or stroke (Ministry of Religion, 2006[b]). Health workers are completed with "*Indonesian Formularium on Pilgrim Health Book Edition IV*" to be the guidance to facilitate health services for pilgrims for efficient treatments. The kloter health workers should report daily to co-chief of health services for evaluation and planning.

So professional health workers should support pilgrimage, as to maintain health. It also needs a good and professional system to maintain Indonesian pilgrim health which should continuously be updated according on safety, environments, science and technology development. As the majority of pilgrims were old people and the highest mortality among the pilgrims is due to circulatory diseases. Moreover, it is known that hypertension is one of the causes of heart failure. This study aimed to determine blood pressures among high risk pilgrims after *umrah* in Mecca, Saudi Arabia and blood pressure in Indonesia with influencing factors: sex, Body Mass Index, accommodation room density, and number of condition or having diseases.

METHODS

It was an observational study. There were 28 persons (18%) from 165 high risk pilgrimage candidates who voluntarily participated in the study. The total pilgrims on the flight group kloter (*kelompok terbang*) JKS 30 Jakarta-Bekasi embarkations port were 450 people that composed of 299 candidates from Purwakarta District and 156 candidates from Bandung Municipality. The 165 candidates (36,6%) were classified as high risk due to being old or having diseases (Ministry of Health, 2003).

Data on pilgrim conditions such as old people or having diseases, blood pressure in Indonesia, haemoglobin blood level were obtained from pilgrim health book that was examined at the last health examination in Indonesia during December 2002. The blood pressure, pulse, body temperature, weight and height after *umrah* were taken at the third week of February 2003 in Saudi Arabia or about 2 months after the examination in Indonesia. The blood pressure was taken with sitting position of the respondents.

Criteria for old persons were those aged 60 years old or above. Hypertension was determined if systolic blood pressure ≥ 140 mmHg and/or diastolic ≥ 90 mmHg. Hypotension was determined if systolic blood pressure ≤ 90 mmHg and/or diastolic ≤ 50 mmHg (Ministry of Health, 2003).

Mean differences of systolic and diastolic blood pressure in Indonesia and after *umrah* was compared by paired t-test. Data on sex and systolic blood pressure was analyzed by bivariate analysis. Systolic blood pressure after *umrah* in Indonesia is regressed to systolic blood pressure before *umrah*, controlling confounding variables, to find a fit model.

The health team in kloter 30 JKS Jakarta-Bekasi embarkation port was composed of one doctor and two nurses.

RESULTS

Table 1. High Risk Pilgrims of Kloter JKS 30, Year 2003

No	Condition/Diseases	n (%)
1.	Old people	59 (37.1)
2.	Hypertension	41 (25.8)
3.	Hypotension	4 (2.5)
4.	Coronary heart disease	1 (0.6)
5.	Post heart disease operation	1 (0.6)
6.	Asthma Bronchiale	1 (0.6)
7.	Diabetes mellitus (DM)	2 (1.2)
8.	Stone of urinary system	1 (0.6)
9.	Neuropsychiatric disease	1 (0.6)
10.	Obesity	3 (1.9)
11.	Drug allergy	3 (1.9)
12.	Allergic condition,	1 (0.6)
13.	Allergic condition and gastritis	1 (0.6)
14.	Allergic condition and old persons	1 (0.6)
15.	Hypertension and old people	21 (13.2)
16.	Hypertension and DM	2 (1.2)
17.	Hypertension and gastritis	1 (0.6)
18.	Hypertension and uric acid	1 (0.6)
19.	Gastritis and rheumatic	3 (1.9)
20.	Old people and gastritis	4 (2.5)
21.	Chronic respiratory and UTI*	1 (0.6)
22.	Hypertension, old person, rheumatic	1 (0.6)
23.	Old person, rheumatic, gastritis	1 (0.6)
24.	Hypertension, old person, DM	3 (1.9)
25.	DM, coronary disease, UTI	1 (0.6)
Total		**159 (100)**

* UTI: Urinary Tract Infection

Table 1 showed that the majority of the pilgrimages were old people (37.1%) and followed by 25.8% with hypertension, 13.2% respondents in combination of old people and hypertension. In accordance with these, Table 2 showed that the majority (53.6%) of high risk respondents were old people, 14.3% hypertension, 10.7% in combination of old persons and hypertension.

Table 2. High Risk Respondents of Kloter JKS 30, Year 2003

No	Condition/ Diseases	n (%)
1.	Old people	15(53.6)
2.	Hypertension	4(14.3)
3.	Diabetes Mellitus	1(3.6)
4.	Hypertension, old persons	3(10.7)
5.	Hypertension, gastritis	1(3.6)
6.	Old people, gastritis	1(3.6)
7.	Old people, allergic condition	1(3.6)
8.	Gastritis, allergic condition	1(3.6)
9.	Hypertension, old persons, rheumatic	1(3.6)
Total		**28(100)**

The majority (85.7%) respondents were females with the average age of 63.39 years. The average haemoglobin level among respondents was 12.51 mg/% or within the normal range of 12.0–17.0 mg/%.

The average of Body Mass Index (BMI) was between 18.7–23.8 categorized as normal (Shetty, 1994). The minimum and maximum size of accommodation rooms were 3.2 × 3.3 m^2 and 4 × 6 m^2, respectively. Meanwhile, the number of pilgrims who stay in a room, the fewest persons were three pilgrims and the highest were ten pilgrims. The pilgrim room density was 0.37 m^2. The average temperature during respondents' stay in Mecca was 39° C.

Table 3. The Respondent Characteristics of Kloter JKS 30, Year 2003

Characteristics	n (%)
Sex	
Males	4 (14.3)
Females	23 (85.7)
Age (years)	
Mean	63.39 ± 7.9 years
Minimum	41 years
Maximum	77 years
Haemoglobin (mg/%)	
Mean	12.51 ± 1.8
Minimum	9
Maximum	15.4

Table 4. BMI and Room Density in Mecca among Respondents of Kloter JKS 30, Year 2003

Variables	Mean	Minimum	Maximum
Body Mass Index (kg/m^2)	23.71 ± 4.1		
Room density	0.37 m^2	0.22 m^2	0.52 m

The mean blood pressures of the respondents in Indonesia were 141.1 ± 20.6 mmHg for systolic and 85.4 ± 7.4 mmHg for diastolic. Meanwhile, the mean blood pressures of the respondents after taking *umrah* in Saudi Arabia relatively decreased to 130,5 ± 17,2 mmHg for systolic and 79,3 ± 7,8 mmHg for diastolic. The average pulse among respondents after *umrah* was 76.3 ± 8.9 beats per minute or normal. It was in accordance with the body temperature, at the average of 36,7° C or not febrile.

Table 5. The Blood Pressure and Other Signs of Respondents Kloter JKS 30 Year 2003 in Indonesia and After *Umrah* in Saudi Arabia

Variables	Before *Umrah*				After *Umrah*		
	Min	Max	Mean ± SD		Min	Max	Mean ± SD
Blood Pressure (mmHg)				Blood Pressure (mmHg)			
Systolic	100	170	141.1 ± 20.6	Systolic	100	190	130.5 ± 17.2
Diastolic	70	100	85.4 ± 7.4	Diastolic	70	100	79.3 ± 7.8
				Pulses (per minute)	60	100	76.3 ± 8.9
				Body Temperatures (° C)	35.6	37.5	36.7 ± 0.45

Table 6. The Paired t-test of Blood Pressure among High Risk Respondents of Kloter JKS 30, Year 2006 in Indonesia and after *Umrah* in Saudi Arabia

Variables	Mean	Std deviation	Std error mean	95% CI	t	df	*p*
Blood pressure (mmHg)							
Systolic	10.54	18.57	3.51	3.33–17.74	3.001	27	0.006
Diastolic	6.07	8.85	1.67	2.64–9.51	3.627	27	0.001

Table 7. The Results of Regression Analysis of Systolic Blood Pressure among High Risk Respondents of Kloter JKS 30, Year 2003 after *Umrah* in Saudi Arabia

Variables	β	Std error	t	p
Constant	53.16	18.19	2.81	0.009
Systolic Blood pressure before *umrah*	0.43	0.13	3.44	0.002
Number of condition/diseases	11.94	4.66	2.56	0.017

Either systolic or diastolic blood pressure is statistically significantly different, before *umrah* in Indonesia and after *umrah* in Saudi Arabia ($p < 0.05$).

Sex was not associated with the systolic blood pressure after *umrah* ($p > 0.9$). Then the dependent variable systolic blood pressure after *umrah* is regressed to independent variables: systolic blood pressure in Indonesia before *umrah*, BMI, room density and number of conditions/diseases, the results is that room density and BMI were excluded, respectively. The final linear regression model was presented at Table 7.

An increase of 1 mmHg systolic blood pressure in Indonesia will just increase 0.43 mmHg of systolic blood pressure after *umrah* in Saudi Arabia if number of condition/diseases to be constant. For 1 number of condition/diseases, it will increase 11.94 mmHg of systolic blood pressure after *umrah* in Saudi Arabia, at systolic blood pressure in Indonesia to be constant.

The diastolic blood pressure after *umrah* in Saudi Arabia was relatively decreased but statistically not significant, ($p > 0.05$).

DISCUSSION

The *kelompok terbang* (*kloter*) or flight group 30 JKS from embarkation port Jakarta-Bekasi departed from Indonesia on 22nd January 2003 was the second round pilgrimage that firstly visited Mecca to do *umrah* and hajj for about 30 days. Then pilgrims went to Medina and stayed in 8 days to conduct the "*sunah*" of religious duties. So the overall duration of the pilgrimage with the transportation was about 40 days. During the pilgrimage, pilgrims conduct *umrah* that is visiting Ka'bah to do *thawaf*, *sa'i*, *tahalul* or cut some hair to get Allah's blessing; and hajj that is visiting Ka'bah to do some deeds, such as *wukuf* that is staying in Arafah desert at 9th Dulhijjah, *thawaf*, *sa'i* and other deeds for Allah's summons to get His blessing (Ministry of Religion, 2006[a]).

Umrah and Hajj are hard physical activities as pilgrims are necessary to walk for praying 5 times a day, totally at about 350–400 km in 38–40 days from their accommodation to mosques, besides *thawaf* and sa'i. Moreover, it is with higher surrounding climate with the average temperature of 39° C. And until year 2014, Saudi Arabia has winter. So pilgrims should maintain their health conditions by consuming usual medications, enough calories and hygienous food for maintaining their health.

The majority of high risk pilgrims of kloter JKS 30 year 2003 there were old people, hypertension, DM, obesity, gastritis in accordance with the high risk respondents under the study. The high risk respondents were old people with the average of 63.39 years old, but with normal BMI and haemoglobin level. Before *umrah* or the third day before hajj, the respondents were having normal pulse of 76.3 beats per minute and not febrile. For blood pressures, the mean systolic blood pressure of the respondents was significantly decreased from 141.1 mmHg in Indonesia to 130.5 mmHg in Mecca. Similarly, the

mean diastolic blood pressure of the respondents was significantly decreased from 85.4 mmHg in Indonesia to 79.3 mmHg in Mecca.

For influencing factors, sex was not associated with systolic blood pressure as either males or females likely conducted *umrah* intensely. BMI was neither associated with systolic blood pressure seemed that the majority of respondents had normal BMI. For accommodation, all the pilgrim rooms were air conditioned with permanent window constructions. The average density of the accommodation room in Mecca was 0.37 m^2 as pilgrims had to share with others or mostly was 6 pilgrims per room. The room density was not associated with systolic blood pressure, possibly Indonesians were friendly enough so they were relatively easy to adapt with other pilgrims.

The systolic blood pressure of respondents after *umrah* tended to decreased to 0.43 mmHg in comparison to 1 mmHg increase in Indonesia, at number of condition/diseases to be constant. Possibly *umrah*, caused psychological sincerity (*ikhlas*) as their intention to visit Ka'bah which in turn caused the decrease of sympathetic innervations system in brainstem for blood pressure to lower of systolic blood pressure (Fauci, 1989). A study on meditation among 120 individuals with hypertension or blood pressure near hypertensive levels showed that calmness caused lower blood pressure (Lanes, 2009).

On the other hand, the systolic blood pressure after *umrah* tended to increase to 11.94 mmHg for 1 number of condition/diseases, at systolic blood pressure in Indonesia to be constant. The pilgrimage activities was hard, moreover in higher climate at the average of 39° C. Likely that the peripheral vasoconstriction caused increased systolic blood pressure for degenerative old person conditions, atherosclerosis in DM, or psychological factor in gastritis (Fauci AS, 1989).

Diastolic blood pressure was not significantly decreased after *umrah* in comparison to the examination in Indonesia, possibly the diastolic blood pressure among old people tends to decrease or a widen difference between systolic and diastolic blood pressure.

Hence, it needs to educate pilgrimage candidates so they could identify and control their diseases since in Indonesia. It also advices the candidates to do physical exercises in Indonesia, such as walking 5–10 km in one day, twice a week, the similar distance with what they will do in Saudi Arabia. Besides, pilgrims should make preparations since in Indonesia as doing health examination, bringing drugs used to consume, doing physical exercises in accordance with their conditions, bringing thick cloths to protect from cold weather, consuming hygiene foods during travel, not conducting non religious duties, not consuming alcohol-cigarettes-soda as dehydration triggers. Then in Saudi Arabia, pilgrims should *maintain their* physical conditions, like protection from cold exposures, eating regularly, wearing enough cloth to protect cold exposure, not consuming alcohol-cigarettes-soda as dehydration triggers and cold drink, doing *shower* with soap, using moisture cream, wearing maskers, hats, gloves, shocks (Ministry of Religion, 2006).

For kloter health workers, as pilgrimage is a hard physical activity especially for high risk pilgrims, blood pressure of the pilgrims should be controlled because blood pressure is one of health indicators of the pilgrims. Furthermore, circulatory diseases are the first cause of death during pilgrimage and hypertension is one of the causes of heart failure.

CONCLUSION AND RECOMMENDATION

Conclusions

The systolic blood pressure of respondents after *umrah* tended to decreased to 0.43 mmHg in comparison to 1 mmHg increase in Indonesia, at number of condition/disease to be constant. Possibly *umrah*, caused psychological sincerity (*ikhlas*) due to their intention to visit Ka'bah that influenced the decrease of sympathetic innervations system in brainstem for blood pressure to lower of systolic blood pressure. On the other hand, the systolic blood pressure after *umrah* tended to increase to 11.94 mmHg for 1 number of condition/diseases, at systolic blood pressure in Indonesia to be constant. The pilgrimage activity was hard, moreover in higher climate at the average of 39° C. Likely that the peripheral vasoconstriction caused increased systolic blood pressure because of degenerative, vasoconstriction or psychological conditions.

Recommendation

For kloter health workers, as pilgrimage is a hard physical activities especially for high risk pilgrims, blood pressure of the pilgrims should be controlled because blood pressure is one of health indicators of

the pilgrims. Furthermore, hypertension is one of the causes of heart failure.

REFERENCES

Fauci AS, et al. Editor, 1989. *Harrison's Principles of Internal Medicine* 14th Edition Volume 2. MacGraw-Hill. New York.

Kusuma D, 1989. *Masalah Kesehatan Yang Akan Dihadapi Calon Jamaah Haji*. Balai Penerbit FK Universitas Indonesia. Jakarta.

Lanes J, 2009. *Calm Dowm Study Tests Meditation As Aids In Controlling Blood Pressure*. Psiko-HT\Stress (Psychology). MSN Encarta-HT_files\'Calm Down' Study Tests Meditation as Aid in Controlling Blood Pressure, Blood Pressure.htm.

Ministry of Health, 2003. *Manifest Jamaah Haji Kloter 30 Embarkasi Jakarta/Bekasi Tahun 2003*, Ministry of Health. Jakarta.

Ministry of Religion, 1995. *Bimbingan Kesehatan Haji*. Ministry of Religion. Jakarta.

Ministry of Religion, 2005. *Pedoman Penatalaksanaan Penyakit Jemaah Haji Indonesia*, Ministry of Religion. Jakarta.

Ministry of Religion, 2006 b. *Bunga Rampai Perhajian IV*. Ministry of Religion. Jakarta.

Ministry of Religion, 2006a. *Buku Manasik Haji*. Ministry of Religion. Jakarta.

Shetty PS, James WPT, 1994. *Body Mass Index. A Measure of Chronic Energy Deficiency in Adults*. Food and Agriculture Organization of United Nations. Rome.

Sukarna, 1986. *Ibadah Haji dan Aerobika*.